1. A microlens array for use in an imaging device comprising:

an imaging array;

a light condensing layer provided on said imaging array, said light condensing layer having a plurality of microlenses each corresponding to one or more pixels of said array; and

a transparent insulation layer formed on said light condensing layer.

2. The microlens array of claim 1, wherein said light condensing layer is a layer of optical thermoplastic.

3. The microlens array of claim 2, wherein the optical thermoplastic is selected from the group consisting of polymethylmethacrylate, polycarbonate, polyolefin, cellulose acetate butyrate, and polystyrene.

4. The microlens array of claim 1, wherein said light condensing layer is a layer of polyimide.

5. The microlens array of claim 1, wherein said light condensing layer is a layer of thermoset resin.

6. The microlens array of claim 5, wherein the thermoset resin is an epoxy resin.

7. The microlens array of claim 1, wherein said light condensing layer is a layer of photosensitive gelatin.

8. The microlens array of claim 1, wherein said light condensing layer is a layer of radiation curable resin.

9. The microlens array of claim 8, wherein the radiation curable resin is selected from the group consisting of acrylate, methacrylate, urethane acrylate, epoxy acrylate, and polyester acrylate.

10. The microlens array of claim 1, wherein said transparent insulation layer is formed by a low temperature plasma deposition process.

11. The microlens array of claim 10, wherein the low temperature plasma deposition process is performed at temperatures within the range of approximately 200 to 400 degrees Celsius.

12. The microlens array of claim 1, wherein said transparent insulation layer is a layer of silicon oxide.

13. The microlens array of claim 1, wherein said transparent insulation layer is a layer of silicon nitride.

14. The microlens array of claim 1, wherein said transparent insulation layer is a layer of silicon oxynitride.

15. The microlens array of claim 1, wherein the microlenses are circular lenses.

16. The microlens array of claim 1, wherein the microlenses are lenticular lenses.

17. The microlens array of claim 1, wherein the microlenses are ovoid lenses.

18. The microlens array of claim 1, wherein the microlenses are rectangular lenses.

19. The microlens array of claim 1, wherein the microlenses are hexagonal lenses.

20. The microlens array of claim 1, wherein said microlens has a thickness of from about 0.3 μm to about 5.0 μm.

21. The microlens array of claim 1, further comprising a spacer layer under said light condensing layer.

22. The microlens array of claim 21, wherein said spacer layer has a thickness of from about 1 μm to about 20 μm.

23. A microlens array for use in an imaging device comprising:

an array of microlenses, each microlens comprising a refractive layer and a transparent insulation layer.

24. The microlens array of claim 23 wherein the refractive layer is a layer of optical thermoplastic.

25. The microlens array of claim 24 wherein the optical thermoplastic is selected from the group consisting of polymethylmethacrylate, polycarbonate, polyolefin, cellulose acetate butyrate, and polystyrene.

26. The microlens array of claim 23 wherein the refractive layer is a layer of polyimide.

27. The microlens array of claim 23 wherein the refractive layer is a layer of thermoset resin.

28. The microlens array of claim 23 wherein the refractive layer is a layer of photosensitive gelatin.

29. The microlens array of claim 23 wherein the refractive layer is a layer of radiation curable resin.

30. The microlens array of claim 29 wherein the radiation curable resin is selected from the group consisting of acrylate, methacrylate, urethane acrylate, epoxy acrylate, and polyester acrylate.

31. The microlens array of claim 23 wherein the transparent insulation layer is formed by a low temperature plasma deposition process.

32. The microlens array of claim 31wherein the low temperature plasma deposition process is performed at temperatures within the range of approximately 200 to 400 degrees Celsius.

33. The microlens array of claim 23 wherein the transparent insulation layer is a layer of silicon oxide.

34. The microlens array of claim 23 wherein the transparent insulation layer is a layer of silicon nitride.

35. The microlens array of claim 23 wherein the transparent insulation layer is a layer of silicon oxynitride.

36. The microlens array of claim 23 wherein the microlenses are circular lenses.

37. The microlens array of claim 23 wherein the microlenses are lenticular lenses.

38. The microlens array of claim 23 wherein the microlenses are ovoid lenses.

39. The microlens array of claim 23 wherein the microlenses are rectangular lenses.

40. The microlens array of claim 23 wherein the microlenses are hexagonal lenses.

41. The microlens array of claim 23 wherein said microlens has a thickness of from about 0.3 μm to about 5.0 μm.

42. The microlens array of claim 23 further comprising a spacer layer under said light condensing layer.

43. The microlens array of claim 42 wherein said spacer layer has a thickness of from about 1 μm to about 20 μm.

44. A solid-state imager comprising:

an array of pixel sensor cells formed at an upper surface of a substrate;

a protective layer formed over said array; and

an array of microlenses formed on said protective layer, each microlens comprising a transparent insulation layer formed over a refractive layer.

45. The imager of claim 44, wherein the imager is a CMOS imager.

46. The imager of claim 44, wherein the imager is a CCD imager.

47. The imager of claim 44, wherein said array of microlenses is formed so that each pixel of said array of pixel sensor cells has a corresponding microlens formed above it.

48. The imager of claim 44, further comprising a color filter layer formed over said protective layer and under said array of microlenses.

49. The imager of claim 44, wherein the refractive layer is a layer of material selected from the group consisting of optical thermoplastic, polyimide, thermoset resin, photosensitive gelatin, and radiation curable resin.

50. The imager of claim 49, wherein the optical thermoplastic is selected from the group consisting of polymethylmethacrylate, polycarbonate, polyolefin, cellulose acetate butyrate, and polystyrene.

51. The imager of claim 49, wherein the radiation curable resin is selected from the group consisting of acrylate, methacrylate, urethane acrylate, epoxy acrylate, and polyester acrylate.

52. The imager of claim 44, wherein the transparent insulation layer is formed by a low temperature plasma deposition process.

53. The imager of claim 52, wherein the low temperature plasma deposition process is performed at temperatures within the range of approximately 200 to 400 degrees Celsius.

54. The imager of claim 44, wherein the transparent insulation layer is a layer of silicon oxide.

55. The imager of claim 44, wherein the transparent insulation layer is a layer of silicon nitride.

56. The imager of claim 44, wherein the transparent insulation layer is a layer of silicon oxynitride.

57. An imager comprising:

an imaging array having a plurality of pixel sensor cells formed at an upper surface of a substrate and providing output data representing an image;

an array of microlenses formed on the imaging array, wherein each microlens has a transparent insulation layer formed over a refractive layer; and

a processor for receiving and processing data representing the image.

58. The imager of claim 57, wherein said arrays and said processor are formed on a single substrate.

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59. The imager of claim 57, wherein said arrays are formed on a first substrate and said processor is formed on a second substrate.

Subt B'

60. A method of forming a microlens array for use in an imaging device, said method comprising the steps of:

providing a substrate having an array of pixel sensor cells formed thereon and a protective layer over the cells;

forming a lens forming layer on at least a portion of the protective layer;

forming microlens array from said lens forming layer; and

forming an insulation layer on said microlens array.

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61. The method of claim 60, wherein the substrate further comprises a CMOS pixel array formed thereon.

62. The method of claim 60, wherein the substrate further comprises a CCD pixel array formed thereon.

63. The method of claim 60, wherein said step of forming the lens forming layer comprises a spin-coating process.

64. The method of claim 60, wherein the lens forming layer is a layer of material selected from the group consisting of optical thermoplastic, polyimide, thermoset resin, photosensitive gelatin, and radiation curable resin.

65. The method of claim 64, wherein the optical thermoplastic is selected from the group consisting of polymethylmethacrylate, polycarbonate, polyolefin, cellulose acetate butyrate, and polystyrene.

66. The method of claim 64, wherein the radiation curable resin is selected from the group consisting of acrylate, methacrylate, urethane acrylate, epoxy acrylate, and polyester acrylate.

67. The method of claim 60, wherein the insulation layer is a layer of material selected from the group consisting of silicon oxide, silicon nitride, and silicon oxynitride.

68. The method of claim 60, wherein said insulation layer forming step comprises a chemical vapor deposition step.

69. The method of claim 60, wherein said insulation layer forming step comprises a low temperature plasma deposition step.

70. The method of claim 69, wherein the low temperature is a temperature within the range of approximately 200 to 400 degrees Celsius.

71. The method according to claim 60, further comprising forming a spacer layer under said microlens array.

72. The method according to claim 71, wherein said spacer layer has a thickness of from about 1 μm to about 20 μm.

Subt B²

73. A method of forming a microlens array for use in an imaging device, said method comprising the steps of:

forming a lens forming layer on an imaging device;

treating said lens forming layer to form a plurality of microlenses; and

forming a radiation transparent insulation layer on each microlens.

74. The method of claim 73, wherein the lens forming layer is a layer of material selected from the group consisting of optical thermoplastic, polyimide, thermoset resin, photosensitive gelatin, and radiation curable resin.

75. The method of claim 74, wherein the optical thermoplastic is selected from the group consisting of polymethylmethacrylate, polycarbonate, polyolefin, cellulose acetate butyrate, and polystyrene.

76. The method of claim 74, wherein the radiation curable resin is selected from the group consisting of acrylate, methacrylate, urethane acrylate, epoxy acrylate, and polyester acrylate.

77. The method of claim 73, wherein said treating step comprises a baking step.

78. The method of claim 77, wherein said baking step is carried out at a temperature within the range of approximately 100 to 350 degrees Celsius.

79. The method of claim 73, wherein said treating step comprises a radiation exposure step.

80. The method of claim 73, wherein the insulation layer is a layer of silicon oxide.

81. The method of claim 73, wherein the insulation layer is a layer of silicon nitride.

82. The method of claim 73, wherein the insulation layer is a layer of silicon oxynitride.

83. The method of claim 73, wherein said insulation layer forming step comprises a chemical vapor deposition step.

84. The method of claim 73, wherein said insulation layer forming step comprises a plasma deposition step carried out at a temperature within the range of approximately 200 to 400 degrees Celsius.

85. The method according to claim 73, further comprising forming a spacer layer under said lens forming layer before formation of said lens forming layer.

86. The method according to claim 85, wherein said spacer layer has a thickness of from about 1 μm to about 20 μm.

Subt B3

87. A method of forming a microlens array for use in an imaging device, said method comprising the steps of:

forming a lens forming layer on an imaging device;

patterning said lens forming layer to form a plurality of lens forming regions;

treating said plurality of lens forming regions to form a plurality of microlenses; and

forming a transparent insulation layer on the plurality of microlenses.

88. The method of claim 87, wherein the lens forming layer is a layer of material selected from the group consisting of optical thermoplastic, polyimide, thermoset resin, photosensitive gelatin, and radiation curable resin.

89. The method of claim 87, wherein the substrate further comprises a CMOS pixel array formed thereon.

90. The method of claim 87, wherein the substrate further comprises a CCD pixel array formed thereon.

~~91. The method of claim 87, wherein said treating step comprises a baking step.~~

~~92. The method of claim 91, wherein said baking step is carried out at a temperature within the range of approximately 100 to 200 degrees Celsius.~~

~~93. The method of claim 87, wherein said treating step comprises a radiation exposure step.~~

94. The method of claim 87, wherein the insulation layer is a layer of material selected from the group consisting of silicon oxide, silicon nitride, and silicon oxynitride.

95. The method of claim 87, wherein said insulation layer forming step comprises a chemical vapor deposition step.

96. The method of claim 87, wherein said insulation layer forming step comprises a plasma deposition step carried out at a temperature within the range of approximately 200 to 400 degrees Celsius.

97. The method according to claim 87, further comprising forming a spacer layer under said lens forming layer before formation of said lens forming layer.

98. The method according to claim 97, wherein said spacer layer has a thickness of from about 1 μm to about 20 μm.

Subt B4

99. A method of forming a microlens array for use in an imaging device, said method comprising the steps of:

forming a lens forming layer on an imaging device, wherein the lens forming layer is a layer of material selected from the group consisting of optical thermoplastic, polyimide, and thermoset resin;

patterning said lens forming layer to form a plurality of lens forming regions;

heat treating said plurality of lens forming regions to form a plurality of microlenses; and

depositing a transparent insulation layer on the plurality of microlenses at a temperature within the range of approximately 200 to 400 degrees Celsius.